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# **June Lake Public Utility District Water Resource Assessment**

## **Technical Memorandum No. 1 Water Demand Factor Review**

Prepared for:  
Mono County Community  
Development Department

June 2006

***JUNE LAKE PUBLIC UTILITY DISTRICT WATER RESOURCE ASSESSMENT  
TECHNICAL MEMORANDUM No. 1***

## **Water Demand Factor Review**

Prepared For: Mono County Community Development Department

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Reviewed By: John Enloe, P.E.  
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Date: June 5, 2006

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### **PURPOSE AND SCOPE**

The purpose of this subtask is to provide the information to develop an appropriate water demand factor methodology for projection of future potential water demands from the proposed Intrawest Rodeo Grounds development project. The information contained within this memo is for review and discussion by Mono County Community Development Department (Mono County CDD) and June Lake Public Utility District (June Lake PUD) so that a water demand projection methodology can be agreed upon. Agreed water demand factors will then be applied to the July 2005 Rodeo Grounds Specific Plan proposed development of 499 residential units and 22,000 square feet of commercial space under Subtask A.2.

### **ORGANIZATION OF THIS REPORT**

This memo is organized into the following major sections:

- Introduction
- Key Findings
- Summary Recommendations
- Water Purveyors / Resort Areas contacted
- Data, Trends and Analysis

### **INTRODUCTION**

This memo and data contained within have been prepared as part of the June Lake Water Assessment for the proposed Rodeo Grounds development in compliance with California Senate Bills 610 and 221. As noted in the June Lake PUD Master Water Plan (Master Water Plan), August 2004, total estimated future water demand for June Lake PUD's Village

System may be heavily influenced by the projected water demand for the proposed Rodeo Grounds development.

The Master Water Plan projects future water demand for June Lake PUD by remaining developable acreage in the district's territory with the exception of the Rodeo Grounds, which is projected using a gallons per capita per day approach. It was assumed the average day demand for visitors would be 75 gallons per capita per day (gpcd) and 100 gpcd for permanent residents. Using an occupancy factor of 3 persons per unit, the Master Plan estimated an average day Rodeo Grounds water usage potential of 226,000 gallons. Potential water demand of this magnitude is significant to June Lake PUD as it would increase the existing total average day demand in the Village System by approximately 50%.

The resort center development also presents a new water customer type for June Lake PUD and as such there is little district information on which to better project potential Rodeo Grounds water demand. To garner greater knowledge of water uses and demand in these types of developments, and to develop water demand factors that will provide more accurate projections of water demand, several comparison projects were contacted for water usage data.

After discussion with Mindy Pohlman, General Manager of June Lake PUD, the goal was to obtain data from two or three water purveyors serving comparison projects also located within the Sierra Nevada. If no good data was available, out-of-state water purveyors serving ski areas in high desert / pine forest conditions would be contacted.

Key findings of the research are summarized in the following section. Presentation and discussion of data supporting the findings are presented in the remainder of this memo.

## **KEY FINDINGS**

Telephone interviews with the water purveyors contacted revealed that resort center development is still relatively new and there is little long-term metered water demand data available. Most of the developments have occurred over the last approximately 3 years (or are still expanding) and in many of these developments the condominium units and commercial spaces have either not yet sold out or are not yet being fully utilized. Nevertheless, some water purveyors have been willing to share their data. Analysis of this data yields the following key findings:

- Mammoth Lakes is the best comparison project area in terms of residential unit product type and geographic location. Although historically June Lake has had greater summer than winter visitation, it is expected that the Rodeo Grounds would draw a similar visitation pattern to the recent Intrawest development at Mammoth Lakes.
- There is strong similar seasonal variation in water use by comparison area and by type of water customer. The peak season is summer due to irrigation; however, for the hotel/condo and condominium water customers, indoor unit use is greater during the winter season.

- The hotel/condo portions of resort centers experience peak use during the ski season. Condominium usage peaks during winter and summer with the exception of Kirkwood, which only peaks during the winter.
- Only Squaw had any data on proportion of water use in the hotel/condo buildings used by commercial services. Commercial usage data was provided by June Lake PUD and may be used for the commercial space in the resort area, or the comparison data of water use per residential unit which includes commercial usage for the hotel/condo product may be used.
- Single family usage is the most difficult to establish water demand factors for due to the large range of lot sizes, age of homes, and extent of landscaping at the different comparison project areas. Multi-family has the most consistent year-round usage, and also shows strong seasonal variation.
- Planning documents indicate a wide range of water demand factors used for projecting water demands at ski area resort developments.

## **SUMMARY RECOMMENDATIONS**

Based on the research contained in this memo, the following recommendations are presented for consideration in projecting Rodeo Grounds water use:

1. Based on the most likely Rodeo Grounds visitation pattern for each water customer class, the following recommendations are made:

### AREA 1 (RESORT CENTER)

#### Hotel/Condo (Buildings A, B, C)

- Either A) Weighted Average Usage per Hotel/Condo unit
- Or B) Mammoth Condominium Usage per unit plus  
June Lake Commercial Usage per building square foot

#### Condominiums (Buildings D, E, F), and Cabins (Building H)

- Mammoth Intrust-Developed Condominium Usage per unit

#### Duplex (Buildings G)

- June Lake PUD Non-Resident Single Family and Condominium Units  
Combined Weighted Average use per unit

#### Affordable Housing

- All comparison project areas weighted average Multi-family use per unit

## AREAS 2, 3 4, AND 5

### Single Family, Duplex & Fourplex

- June Lake PUD Non-Resident Single Family and Condominium Units Combined Weighted Average use per unit

### Affordable Housing

- Resident Single Family Mammoth Use per unit per year, spread to each month using the June Lake PUD historic monthly usage pattern

2. Estimate water demand for Rodeo Grounds using the comparison project data presented in this memo. This is the preferred methodology because it utilizes data specific to similar types of developments. In contrast, the methodology employed in the Master Water Plan above uses national average water demand numbers and is based on an assumption of year-round occupancy of 3 persons per room. Planning documents are also not recommended because they have a wide range of product types included in each of the land uses and are used for master planning rather than specific planning purposes.
3. Water demand projections should be conducted by multiplying per unit demand by the number of units for each month of the year and summing to obtain total annual water demand. This should be conducted for each water customer class. It is important to project water demands based on the expected visitation pattern of the water customers because a constant average monthly demand approach may over- or under-estimate total water needs during certain periods of the year, with implications for seasonal use of water resources and, potentially, water rights.

A simple example of this is shown below using June Lake PUD data for a non-resident single family unit:

	Ref	Per Unit Monthly Usage in Thousands of Gallons												Per Single Family Unit	
		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total	Monthly
June Lake Weighted Average Use per Unit [1]	A	4.4	4.5	3.4	2.7	3.0	5.6	9.1	9.3	7.9	6.8	5.3	2.4	64.4	5.4
Average per Month	B	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	64.4	5.4
June Lake Master Plan for Rodeo Grounds [2]	C	14.0	14.0	12.6	14.0	13.5	14.0	13.5	14.0	14.0	13.5	14.0	13.5	164.3	13.7
Difference - B minus A		0.9	0.9	1.9	2.7	2.4	(0.3)	(3.7)	(3.9)	(2.5)	(1.4)	0.0	3.0	-	
Difference - C minus A		9.5	9.5	9.2	11.3	10.5	8.3	4.4	4.7	6.1	6.7	8.6	11.1	99.9	

[1] Data provided by June Lake PUD shown in this report in Table 5.

[2] Based on 75 gallons per person per day with an occupancy rate of 3 persons per (bed)room per the June Lake Water Master Plan. This table assumes an average of 2 (bed)rooms per home.

Water usage for a Rodeo Grounds non-resident (vacation) single family unit that is projected on June Lake PUD's own historical data average monthly usage (Ref 'B'), for example, would overestimate water use during the months of November through April, and would underestimate water use June through September. Using the Water Master Plan projection methodology for the Rodeo Grounds (Ref 'C'), water use would be overestimated for all months of the year.

## **WATER PURVEYORS / RESORT AREAS CONTACTED**

Table 1 lists the ski towns/resorts that were identified as potential candidates for comparison water usage data. These areas were chosen because they fit the following criteria:

- 1) Primarily a winter ski resort destination;
- 2) Recently experienced development, or currently experiencing development, in particular the development of a resort complex, (often called a 'Village' after European-style architecture), and often an accompanying form of 'Mountain Club' incorporating fractional home ownership and traditional timeshare ownership. A cornerstone of this type of development is hotel/condo ownership with commercial uses on the ground floor.
- 3) Similar elevation (and therefore potentially similar plant growing conditions).

Table 1 lists the water purveyors contacted, the resort area they serve, and response from those providers. Resort areas with Intrawest projects are highlighted with an asterisk.

## **DATA, TRENDS, AND ANALYSIS**

To apply the data and resulting water demand factors to the proposed Rodeo Grounds, each product type had to be categorized by water customer classification. Table 2 lists the product types proposed at Rodeo Grounds, lists average square feet per product type, and the water customer classification that is used in this analysis. For this analysis, the following customer classifications were identified:

- **Hotel/Condo**  
Condominium units (possibly fractional ownership) in buildings that are managed like a hotel, with a mixture of commercial uses below. Irrigation will likely be separately metered.
- **Condominium**  
Condominium units (possibly traditional timeshare). Irrigation may or may not be separately metered.
- **Non-Resident Single Family**  
Single family homes most likely purchased as vacation or second homes that tend to display strong seasonal water usage.
- **Resident Single Family**

Single family homes intended for year-round habitation. This applies to the affordable housing single family land use category outside Area 1.

- **Resident Multi-family**

Multi-family housing intended for year-round habitation. This applies to the affordable housing in the resort complex Area 1 (potentially to be utilized by project-generated seasonal employees).

Data for each of these water customers is described below. Only the past 12 months of data was used for each of the water customers, with the exception of June Lake PUD, who provided 24 months of data. While it is preferable to have several years' worth of data, this does not exist for all the areas, particularly the resort centers, due to their recent construction. In addition, as the areas have developed, both residential units and commercial spaces gain higher occupancy rates.

## Table 1 – Potential Comparison Resort Complexes

**Mono County - June Lake Water Assessment  
Potential Comparison Resort Complexes**

Water Provider			Ski Town / Resort	State	Primary Water Source [1]	Population Served [2]	Elevation at Ski Base [3]	Contact Information			
								Name	Title	Telephone No.	Response
California (Sierra Nevada)											
June Lake Public Utility District			Rodeo Grounds	CA	Surface	658	7,545	Mindy Pohlman	General Manager	760 648 7778	Data Sent
1	Mammoth Community Water District		Mammoth *	CA	Surface	5,285	7,953	Gary Sisson Donna Ross	General Manager	760 934 2596 x238 761 934 2596 x239	Data Sent
2	Squaw Valley Public Services District		Squaw *	CA	Ground	926	6,200	Rick Lierman Aleta Drake	General Manager	530 583 4692 x 200	Data Sent
3	Northstar Community Services District		Northstar	CA	Surface	300	6,330	Jim Lochridge	General Manager	530 562-0747 x 101	Data Sent
4	South Tahoe Public Utility District		Heavenly	CA / NV	Ground	46,900	6,540	Richard Solbrig Sandy Gray	General Manager	530 544 6474 530 543 6225	Data Sent
5	Kirkwood Meadows Public Utility District		Kirkwood	CA	Ground	210	7,800	Tom Henie Michael Sharp	General Manager	209 258 4444 x 2	Data Sent
Colorado (Rockies)											
6	Snowmass Water & Sanitation District		Aspen/Snowmass	CO	Surface	6,353	8,104	Kit Hamby	Director	970 923 2056	Data not received
7	Town of Breckenridge Water Division		Breckenridge	CO	Surface	28,240	9,600	Gary Roberts	Water Division Manager	970 453 2251	Data not received
8	Mountain Village Metropolitan District		Telluride	CO	Ground	3,200	9,500	Robert Hainimg	Water Supervisor	970 369 6240	No response
Utah (Wasatch) and Wyoming (Tetons)											
9	Solitude Ski Resort		Solitude *	UT	Ground	100	7,988	Mike Gore	Vice-president operations	801 942 1391	No response
10	Teton Village Water and Sewer		Jackson Hole	WY	Ground	300	6,311	Patti		307 733 5457	No response

contacts

\* Indicates an Intrawest resort complex has been / is being developed.

[1] Sources: Conversation with water purveyor and/or EPA Safe Drinking Water Information System, query data as of July 15, 2005.

[2] Sources: EPA Safe Drinking Water Information System, query data as of July 15, 2005.

[3] Source: www.skitown.com.



**Table 2 – Product Type and Water Customer Classification**

**Mono County - June Lake Water Assessment**

**Rodeo Grounds Product Type and Water Customer Classification**

Product Type	Average Sq Ft per Unit	Water Customer Classification
<b>Resort Center (Area 1)</b>		
Hotel/Condo ("Lodge, Annex, Inn")		
Residential	1,000	Hotel / Condominium
Commercial	n.a.	Commercial
Condominium	1,500	Condominium
Duplex	2,400	Non-resident single family
Cabins	1,000	Condominium
Affordable Housing	850	Resident multi-family
<b>Areas 2, 3, 4, and 5</b>		
Single Family	varies	Non-resident single family
Duplex	2,000	Non-resident single family
Fourplex	2,000	Non-resident single family
Affordable Housing	1,000	Resident single family

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## **Hotel/Condo**

Table 3 shows that comparison projects include Squaw, Kirkwood, and South Tahoe (Heavenly) ski areas. The hotel/condo product type includes commercial uses below the residential units; however, only Squaw has any data regarding the water use that is commercial versus residential. For all of the hotel/condo complexes with commercial uses, the water purveyor reads one meter per building and leaves the water customer with the responsibility of dividing the water bill between commercial and residential uses. Sub-metering at Squaw estimates an average split of 12.5% of total water demand to be commercial. This is used by the Squaw Village management to split the water bill between commercial tenants and residential tenants/owners.

Figure 1 displays average daily water usage excluding irrigation per unit by month of the year. The graph starts in December as this was considered the beginning of peak ski season water usage. It is evident in the graph that the peak season is winter; however, there is also strong summer usage. This product type will be influenced by special events, particularly during the summer months. To attract summer visitation, resort centers will often host festivals, concerts, conferences, and educational classes. This has a direct impact on water usage. The Grand Marriott Residence at Heavenly, which is served by South Tahoe PUD appears to have the most consistent water use during the course of the year, possibly because of the fractional ownership structure of this product. Ownership is deeded for one week every month of the year. South Tahoe PUD only reads the meter every quarter.

## **Condominium**

Table 4 shows comparison condominium usage excluding irrigation at Mammoth, Squaw, and Kirkwood. Usage between comparison projects during peak ski season is very similar, and summer usage at Squaw and Mammoth is comparable. Mammoth is probably the best comparison project because it is for Intrawest-developed complexes only and probably most similar to the product type proposed at June Lake. Table 4a gives commercial use data for June Lake PUD and Squaw. As an alternate methodology to the per unit approach for the hotel/condo product, hotel/condo use could be projected by using the condominium usage per residential unit and adding projected commercial use per square foot.

Figure 2 displays average daily water usage per unit by month of the year. All figures used in this comparison exclude irrigation demands. Mammoth has the greatest usage per unit, and Kirkwood the lowest.

### Table 3 – Hotel/Condo Water Use Comparison

**Mono County - June Lake Water Assessment  
Hotel/Condo Water Use Comparison**

	Month in Most Recent 12-Month Data Period												Total 12-months	Average per Month *
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov		
<b>Squaw PSD [1]</b>														
Usage (Thousands of Gallons)	1,081.4	1,380.8	1,238.1	1,371.9	920.2	381.0	508.2	784.4	848.7	560.7	490.9	560.8	10,127.1	843.9
Number of Residential Units	290	290	290	290	290	290	290	290	290	290	290	290	290	290
Usage Per Unit per Month	3.7	4.8	4.3	4.7	3.2	1.3	1.8	2.7	2.9	1.9	1.7	1.9	34.9	2.9
Gallons per Unit per Day	120.3	153.6	152.5	152.6	105.8	42.4	58.4	87.3	94.4	64.4	54.6	64.5	1,150.7	95.9
<b>Kirkwood PUD [2]</b>														
Usage (Thousands of Gallons)	141.4	202.0	233.4	215.4	142.9	44.1	29.2	71.1	71.1	45.6	36.7	129.4	1,362.1	113.5
Number of Residential Units	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Usage Per Unit per Month	3.5	5.0	5.8	5.4	3.6	1.1	0.7	1.8	1.8	1.1	0.9	3.2	34.1	2.8
Gallons per Unit per Day	114.0	162.9	208.4	173.7	119.1	35.6	24.3	57.3	57.3	38.0	29.6	107.8	1,128.0	94.0
<b>South Tahoe PUD [3]</b>														
Usage (Thousands of Gallons)	978.4	1,337.7	1,337.7	1,337.7	830.5	830.5	830.5	1,188.8	1,188.8	1,188.8	978.4	978.4	13,006.2	1,083.9
Number of Residential Units	322	322	322	322	322	322	322	322	322	322	322	322	322	322
Usage Per Unit per Month	3.0	4.2	4.2	4.2	2.6	2.6	2.6	3.7	3.7	3.7	3.0	3.0	40.4	3.4
Gallons per Unit per Day	98.0	134.0	148.4	134.0	86.0	83.2	86.0	119.1	119.1	123.1	98.0	101.3	1,330.1	110.8
<b>Recommendation for Rodeo Grounds</b>														
Total Comparison Units	652	652	652	652	652	652	652	652	652	652	652	652	652	652
Usage Per Unit per Month	3.4	4.5	4.3	4.5	2.9	1.9	2.1	3.1	3.2	2.8	2.3	2.6	37.6	3.1
Gallons per Unit per Day *	108.9	144.5	153.9	144.7	96.8	62.1	69.9	101.1	104.3	91.8	74.5	85.3	1,237.9	103.2

hotel/condo

[1] Squaw usage for the Village Phases I and II. Data period May 2004 - April 2005.

[2] Kirkwood usage for the Mountain Club building. Data period July 2004 - June 2005.

[3] South Tahoe PUD Heavenly ski area usage for the Marriott Grand Residence. Total units counted as 322 doors since unit spaces can be configured to various sizes.

Data Period July 2004 - June 2005. Meter read taken per quarter.

\* Interpret last column as average gallons per unit per day in a month.

## Table 4 – Condominium Water Use Comparison

**Mono County - June Lake Water Assessment  
Condominium Water Use Comparison**

Water Purveyor	Month in Most Recent 12-Month Data Period												Total 12-months	Average per Month *
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov		
<b>Mammoth CWD [1]</b>														
Usage (Thousands of Gallons)	552.95	809.45	677.55	789.35	792.70	468.60	667.20	692.93	718.65	647.15	276.25	530.00	7,622.78	635.23
Number of Residential Units	262	262	262	262	262	262	262	262	262	262	262	262	262	262
Usage Per Unit per Month	2.1	3.1	2.6	3.0	3.0	1.8	2.5	2.6	2.7	2.5	1.1	2.0	29.1	2.4
Gallons per Unit per Day	68.1	99.7	92.4	97.2	100.9	57.7	84.9	85.3	88.5	82.3	34.0	67.4	958.3	79.9
<b>Squaw PSD [2]</b>														
Usage (Thousands of Gallons)	610.7	770.8	668.9	651.2	470.8	385.4	374.3	635.1	712.7	426.0	387.4	353.2	6,446.4	537.2
Number of Residential Units	303	303	303	303	303	303	303	303	303	303	303	303	303	303
Usage Per Unit per Month	2.0	2.5	2.2	2.1	1.6	1.3	1.2	2.1	2.4	1.4	1.3	1.2	21.3	1.8
Gallons per Unit per Day	65.0	82.1	78.8	69.3	51.8	41.0	41.2	67.6	75.9	46.9	41.2	38.9	699.7	58.3
<b>Kirkwood PUD [3]</b>														
Usage (Thousands of Gallons)	501.4	854.9	914.4	692.4	528.9	296.3	137.6	265.0	470.3	275.3	226.8	495.8	5,659.0	471.6
Number of Residential Units	374	378	380	388	388	388	388	374	374	374	374	374	380	380
Usage Per Unit per Month	1.3	2.3	2.4	1.8	1.4	0.8	0.4	0.7	1.3	0.7	0.6	1.3	14.9	1.2
Gallons per Unit per Day	43.2	73.0	85.9	57.6	45.4	24.6	11.8	22.9	40.6	24.5	19.6	44.2	493.3	41.1
<b>Recommendation for Rodeo Grounds</b>														
Usage Per Unit per Month	2.1	3.1	2.6	3.0	3.0	1.8	2.5	2.6	2.7	2.5	1.1	2.0	29.1	2.4
Gallons per Unit per Day *	68.1	99.7	92.4	97.2	100.9	57.7	84.9	85.3	88.5	82.3	34.0	67.4	958.3	79.9

condo

[1] Mammoth usage for Intrawest projects Sierra Star, Eagle Run, and Juniper Lodge complexes. Data period July 2004 - June 2005.

[2] Squaw usage for all condominiums served with the exception of the Village units. Data period May 2004 - April 2005.

[3] Kirkwood usage for condominium and cabin complexes. Data period July 2004 - June 2005.

\* Interpret last column as average gallons per unit per day in a month.

## Table 4a – Commercial Space Water Use Comparison

**Mono County - June Lake Water Assessment  
Commercial Space Water Use Comparison**

	Month in Most Recent 12-Month Data Period (gallons/month/Sq Ft unless otherwise noted)												Total	Average
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	12-months	per Month *
<b>June Lake PUD [1]</b>														
Coffee Bar & Deli	0.9	1.4	1.2	1.4	1.6	1.1	1.6	2.5	2.4	1.4	1.5	0.9	17.9	1.49
Construction Co. Office	0.9	1.2	0.7	1.2	1.4	0.9	0.9	4.6	1.9	3.1	2.0	1.1	19.8	1.65
Real Estate Office	2.3	1.0	2.0	2.1	2.8	6.7	11.7	16.6	14.3	13.1	5.2	1.4	79.3	6.60
General Store	4.8	7.9	3.0	3.0	3.1	3.6	4.3	5.2	6.6	5.7	5.8	5.0	58.0	4.83
Retail Store	0.5	0.7	0.6	0.6	0.7	0.7	1.0	1.0	0.6	0.5	0.6	0.5	7.9	0.66
Restaurant & Coffee Shop	6.0	5.6	3.1	2.7	4.3	5.1	6.8	10.2	16.6	7.6	6.8	1.7	76.6	6.38
Restaurant Diner	9.2	11.4	6.8	7.3	9.7	10.9	14.9	13.8	14.1	15.0	11.6	10.4	135.0	11.25
Bar & Café	12.2	8.2	16.8	16.4	20.3	19.0	24.6	25.9	27.5	21.8	18.7	11.3	222.8	18.57
Average Gallons per Sq Ft	4.6	4.7	4.3	4.4	5.5	6.0	8.2	10.0	10.5	8.5	6.5	4.0	77.2	6.43
Gallons per Day per Sq Ft	0.15	0.15	0.15	0.14	0.18	0.19	0.27	0.32	0.34	0.28	0.21	0.13	0.21	
<b>Squaw Valley PSD [2]</b>														
Average Gallons per Sq Ft	1.66	1.66	1.66	1.66	1.66	5.89	5.89	5.89	5.89	5.89	5.89	1.66	46.17	3.85
Gallons per Day per Sq Ft	0.05	0.05	0.06	0.05	0.06	0.19	0.20	0.19	0.19	0.20	0.19	0.06	0.13	0.01

comm

[1] Information provided by June Lake PUD and Mono County Assessor's Office. June Lake PUD data period August 2003 - July 2005.

[2] Squaw Valley data provided by Squaw Valley PSD from the Intrawest Phased Estimate of Total Water Demand, 2000.

Data based on mixed use commercial building with a theatre, general store, bar, and engineering office.

## **Non-Resident Single Family**

Single family proved to be the most difficult customer class for which to obtain data. The reason for this is that there is such a wide range of water use correlating with the wide range of home sizes found at each of these resorts. Old cabins (around 1,200 square feet or less) and new large homes (around 7,000 square feet) can both be found within these resort complexes and the water purveyors consistently commented that this is an area needing further analysis. The water purveyors have not yet separated water usage data between newer and older houses or lot size. Table 5 shows available data from Mammoth, Kirkwood, Breckenridge, and June Lake. The Kirkwood data is not very helpful as the single family homes are older and not utilized as heavily during the summer months. The Mammoth and Breckenridge data includes resident single family homes in their reported figures. June Lake PUD data is the best data for this water customer. The recommended Rodeo Grounds water demand factors are condominium unit usage averaged with single family usage to allow for diversity in size of home and landscaping water requirements.

## **Resident Single Family**

Only June Lake PUD was able to provide monthly information on water usage in homes that are occupied by permanent residents. Table 6 shows this data as well as the average monthly per unit use during the peak winter and summer months experienced at Mammoth CWD. As expected, water use is greater at resident single family homes than non-resident homes. In particular the irrigation peak is noticeable.

## **Resident Multi-family**

Squaw was able to provide the best monthly data for multi-family housing. The data shows that usage is similar to Mammoth CWD which reports average monthly use, peak summer and winter month usage. Monthly data for Squaw and June Lake PUD is provided in Table 7. A weighted average of use at Squaw and June Lake is provided; however, the weighting is heavily toward Squaw as June Lake only has one 3-unit multi-family complex.

## **SEASONAL VARIATION**

The seasonal variation in water demand is evident in each of the Tables 3 through 7. Peak month winter to summer ratios are calculated Table 8. As this table highlights, the greatest variation is in single family usage. Low peak winter to summer month ratios indicate the product types that are more heavily utilized in ski season.

## Table 5 – Non-Resident Single Family and Condo with Irrigation Water Use Comparison

**Mono County - June Lake Water Assessment**

**Non-Resident Single Family and Condo with Irrigation Water Use Comparison**

Water Purveyor	Month in Most Recent 12-Month Data Period												Total	Average
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	12-months	per Month *
NON-RESIDENT SINGLE FAMILY														
Mammoth CWD [1]														
Usage Per Unit per Month (1,000 gallons)		4.4						13.6					91.1	7.6
Gallons per Unit per Day		141.6						439.9					3,036.3	253.0
Kirkwood PUD [2]														
Usage (Thousands of Gallons)	323.0	386.6	373.2	295.2	211.9	109.1	123.5	281.8	278.4	166.7	121.3	228.1	2,898.8	241.6
Number of Residential Units	201	201	201	201	201	201	201	199	201	201	201	201	201	201
Usage Per Unit per Month (1,000 gallons)	1.6	1.9	1.9	1.5	1.1	0.5	0.6	1.4	1.4	0.8	0.6	1.1	14.4	1.2
Gallons per Unit per Day	51.8	62.1	66.3	47.4	35.1	17.5	20.5	45.7	44.7	27.6	19.5	37.8	476.0	39.7
Breckenridge, CO [3]														
Usage Per Unit per Month (1,000 gallons)													97.2	8.1
Gallons per Unit per Day													3,240.0	270.0
June Lake PUD [4]														
Usage (Thousands of Gallons)	22.2	15.9	11.3	6.5	14.7	36.3	87.2	134.2	133.9	68.5	32.2	22.9	585.8	48.8
Number of Residential Units	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Usage Per Unit per Month (1,000 gallons)	2.0	1.4	1.0	0.6	1.3	3.3	7.9	12.2	12.2	6.2	2.9	2.1	53.3	4.4
Gallons per Unit per Day	65.1	46.6	36.8	19.1	44.5	106.5	264.2	393.6	392.7	207.6	94.3	69.4	1,740.3	145.0
CONDO WITH IRRIGATION														
Mammoth CWD [1]														
Usage Per Unit per Month (1,000 gallons)		3.8						8.5					58.2	4.8
Gallons per Unit per Day		123.5						274.7					1,939.9	161.7
June Lake PUD [4]														
Usage (Thousands of Gallons)	1,241.2	1,243.4	960.4	747.5	832.1	1,570.8	2,539.9	2,587.5	2,192.2	1,899.9	1,487.3	664.1	17,966.1	1,497.2
Number of Residential Units	279	279	279	279	279	279	279	279	279	279	279	279	279	279
Usage Per Unit per Month (1,000 gallons)	4.4	4.5	3.4	2.7	3.0	5.6	9.1	9.3	7.9	6.8	5.3	2.4	64.4	5.4
Gallons per Unit per Day	143.5	143.8	122.9	86.4	99.4	181.6	303.5	299.2	253.5	227.0	172.0	79.3	2,112.0	176.0
Recommendation for Rodeo Grounds														
Total June Lake Units	290	290	290	290	290	290	290	290	290	290	290	290	290	290
Usage Per Unit per Month (1,000 gallons)	4.4	4.3	3.4	2.6	2.9	5.5	9.1	9.4	8.0	6.8	5.2	2.4	64.0	5.3
Gallons per Unit per Day *	140.5	140.1	119.7	83.9	97.3	178.8	302.0	302.7	258.7	226.3	169.0	79.0	2,097.9	174.8

non\_res

[1] Mammoth CWD reported average monthly water use for January and July, and average monthly water use over a 12-month period. Total use is the average monthly use multiplied by 12.

Non-resident single family includes mixture of permanently occupied homes and vacation homes. Data period 2004 and 2005.

[2] Kirkwood is primarily a winter destination resort. Data period July 2004 - June 2005.

[3] To date, Breckenridge has only provided annual average use per month.

[4] June Lake PUD data period August 2003 - July 2005.

\* Interpret last column as average gallons per unit per day in a month.

**Table 6 – Resident Single Family Water Use Comparison**

**Mono County - June Lake Water Assessment  
Resident Single Family Water Use Comparison**

Water Purveyor	Month in Most Recent 12-Month Data Period												Total 12-months	Average per Month *
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov		
<b>Mammoth CWD [1]</b>														
Usage Per Unit per Month		6.7						19.4					122.5	10.2
Gallons per Unit per Day		216.1						625.8					4,083.2	340.3
<b>June Lake PUD [2]</b>														
Usage (Thousands of Gallons)	62.2	37.1	33.7	36.6	37.4	77.5	112.1	151.9	112.6	100.0	77.8	54.2	892.9	74.4
Number of Residential Units	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Usage Per Unit per Month	5.7	3.4	3.1	3.3	3.4	7.0	10.2	13.8	10.2	9.1	7.1	4.9	81.2	6.8
Gallons per Unit per Day	182.4	108.9	109.3	107.2	113.2	227.3	339.6	445.5	330.1	302.9	228.0	164.2	2,658.7	221.6
<b>Recommendation for Rodeo Grounds</b>														
Usage Per Unit per Month	8.4	5.0	5.0	4.9	5.2	10.5	15.6	20.5	15.2	14.0	10.5	7.6	122.5	10.2
Gallons per Unit per Day *	271.1	161.8	179.9	159.3	173.8	337.9	521.6	662.2	490.6	465.2	338.9	252.2	4,014.5	334.5

sf\_res

[1] Mammoth CWD reported average monthly water use for January and July, and average monthly water use over a 12-month period. Total use is the average monthly use multiplied by 12.  
Data period 2004 and 2005.

[2] June Lake PUD data period August 2003 - July 2005.

\* Interpret last column as average gallons per unit per day in a month.



**Table 7 - Resident Multi-Family Water Use Comparison**

**Mono County - June Lake Water Assessment  
Resident Multi-family Water Use Comparison**

Water Purveyor	Month in Most Recent 12-Month Data Period												Total	Average
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	12-months	per Month *
<b>Mammoth CWD [1]</b>														
Usage Per Unit per Month (1,000 gallons)		4.2						4.2					45.8	3.8
Gallons per Unit per Day		134.7						136.7					1,526.1	127.2
<b>Squaw PSD [2]</b>														
Usage (Thousands of Gallons)	1,878.0	2,438.6	2,391.9	2,590.4	1,245.5	1,374.5	1,830.9	2,286.8	2,647.6	1,970.1	1,447.2	1,213.7	23,315.0	1,942.9
Number of Residential Units	571	571	571	571	571	571	571	571	571	571	571	571	571	571
Usage Per Unit per Month (1,000 gallons)	3.3	4.3	4.2	4.5	2.2	2.4	3.2	4.0	4.6	3.5	2.5	2.1	40.8	3.4
Gallons per Unit per Day	106.1	137.8	149.6	146.3	72.7	77.6	106.9	129.2	149.6	115.0	81.8	70.9	1,343.4	112.0
<b>June Lake PUD [3]</b>														
Usage (Thousands of Gallons)	5.3	9.4	8.5	7.0	9.4	9.6	8.5	10.3	9.4	8.7	9.3	8.5	103.7	8.6
Number of Residential Units	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Usage Per Unit per Month (1,000 gallons)	1.8	3.1	2.8	2.3	3.1	3.2	2.8	3.4	3.1	2.9	3.1	2.8	34.6	2.9
Gallons per Unit per Day	57.1	101.1	101.2	75.3	103.9	102.7	93.9	110.8	100.5	96.7	100.0	93.9	1,136.9	94.7
<b>Recommendation for Rodeo Grounds</b>														
Total Comparison Units	574	574	574	574	574	574	574	574	574	574	574	574	574	574
Usage Per Unit per Month (1,000 gallons)	3.3	4.3	4.2	4.5	2.2	2.4	3.2	4.0	4.6	3.4	2.5	2.1	40.8	3.4
Gallons per Unit per Day *	105.8	137.6	149.4	146.0	72.9	77.8	106.8	129.1	149.3	114.9	81.9	71.0	1,342.3	111.9

1125

[1] Mammoth CWD reported average monthly water use for January and July, and average monthly water use over a 12-month period. Total use is the average monthly use multiplied by 12. Data period 2004 and 2005.

[2] Squaw data for all area multi-family buildings excluding the Village and some employee housing. Data period May 2004 - April 2005.

[3] June Lake PUD data period August 2003 - July 2005.

\* Interpret last column as average gallons per unit per day in a month.

## Table 8 – Seasonal Variation: Peak Winter to Summer Month Ratios

**Mono County - June Lake Water Assessment**  
**Seasonal Variation: Peak Winter to Summer Month Ratios**

Product Type	Table Reference	Gallons per Unit per Day			Ratio		
		Average Month	Peak Winter Month	Peak Summer Month	Average to Peak Winter	Average to Peak Summer	Peak Winter to Summer
					[1]	[2]	[3]
Hotel/Condo - excludes irrigation	Table 3						
Squaw		96	154	94	1.60	0.98	0.61
Kirkwood		94	208	57	2.22	0.61	0.28
South Tahoe		111	148	123	1.34	1.11	0.83
Condominium - excludes irrigation	Table 4						
Mammoth		80	100	85	1.25	1.07	0.86
Squaw		58	82	68	1.41	1.16	0.82
Kirkwood		41	73	23	1.77	0.56	0.31
Resident Single Family - includes irrigation	Table 6						
Mammoth		4,083	216	626	0.05	0.15	2.90
June Lake		222	182	446	0.82	2.01	2.44
Non-Resident Single Family - includes irrigation	Table 5						
Mammoth		253	142	440	0.56	1.74	3.11
Kirkwood		40	62	46	1.56	1.15	0.74
June Lake		145	65	394	0.45	2.71	6.05
Condominium - includes Irrigation	Table 5						
Mammoth		162	123	275	0.76	1.70	2.23
June Lake		176	144	303	0.82	1.72	2.11
Resident Multi-family - includes irrigation	Table 7						
Mammoth		127	135	137	1.06	1.08	1.02
Squaw		112	150	150	1.34	1.34	1.00
June Lake		95	101	111	1.07	1.17	1.09

ratios

[1] A ratio greater than 1 indicates usage is greater during the peak winter month than the average annual month.

High ratios expected for a ski resort / area with heavy winter use.

[2] A ratio greater than 1 indicates usage is greater during the peak summer month than the average month.

[3] Ratios greater than 1 indicate greater summer than winter usage (expected for customers with irrigation demands).

In addition to the comparison project data, planning documents used for master planning purposes by water purveyors for the comparison project areas were examined for water demand factors. These water demand factors are typically based on historical average water use; however, they often build in a safety margin to cover many different types of water demand customers. For example, the same water demand factor per residential unit may be applied to development of 2 units per acre and 6 units per acre alike.

Table 9 lists the water demand factors from planning documents associated with the identified comparison projects. It is likely that projections using planning document numbers would significantly overestimate demands for Rodeo Grounds. An example of using average monthly demands without accounting for seasonal variation may be taken from Squaw in Table 9, in which data is for the Intrawest-developed Village area only. Squaw had a couple of events during which they could measure the accuracy of the water demand projection. On December 30, 2003 Phases I and II of the Village used 64,100 gallons. This compares with a projection of 65,494 gallons using the water demand factors in Table 9. In July 2003, Phase I of the Village was almost fully occupied for a special event. Squaw's calculated usage for July 22, 2003 was 18,256 gallons compared to the projection of 30,518 gallons. Projected use is based on average use per day with no seasonal variation. (It should be noted that in July 2003 the commercial space was not fully occupied). Squaw's planning water demand factors proved accurate for their peak month during the year, but overestimated annual demand.

The water demand factors that are agreed upon for the proposed Rodeo Grounds project will be applied to the proposed land uses given in the July 2005 Rodeo Grounds Specific Plan. These land uses/product types are shown in Table 10.

**Table 9 – Water Demand Factors from Planning Documents**

**Mono County - June Lake Water Assessment  
Water Demand Factors from Planning Documents**

<i>Planning Document</i>	<b>Northstar</b> <i>Martis Valley Community Plan Environmental Impact Report, 2003</i>	<b>Squaw</b> <i>Intrawest Squaw Valley Village Phased Estimate of Total Water Demand, 2000</i>	<b>Mammoth</b> <i>General Planning Water Demand Factors [2]</i>
	[3]	[3]	
	Gallons per Residential Unit per Year		
Single Family Residential	182,500		91,089
Condominium	109,500		58,197
Multi-family Residential	109,500		45,783
Motel/Hotel	109,500		36,823
	Gallons per Square Foot per Year		
General Commercial [1]	90.8	48.6	121.0
Tourist / Resort Commercial	Gallons per Residential Unit per Year		
1-bedroom	109,500	63,145	
2-bedroom	109,500	78,840	
3-bedroom	109,500	94,170	

- [1] Northstar Commercial projected at 2,600 gallons per day per acre. This has been converted to a square foot demand assuming 80% net developable acreage and a floor-to-area ratio of 30%.  
[2] Factors per email correspondence with Gary Sisson, General Manager Mammoth CWD August 29, 2005.  
[3] Assume full occupancy all year.

**Table 10 – Rodeo Grounds Land Uses**

**Mono County - June Lake Water Assessment**  
**Rodeo Grounds Land Uses [1]**

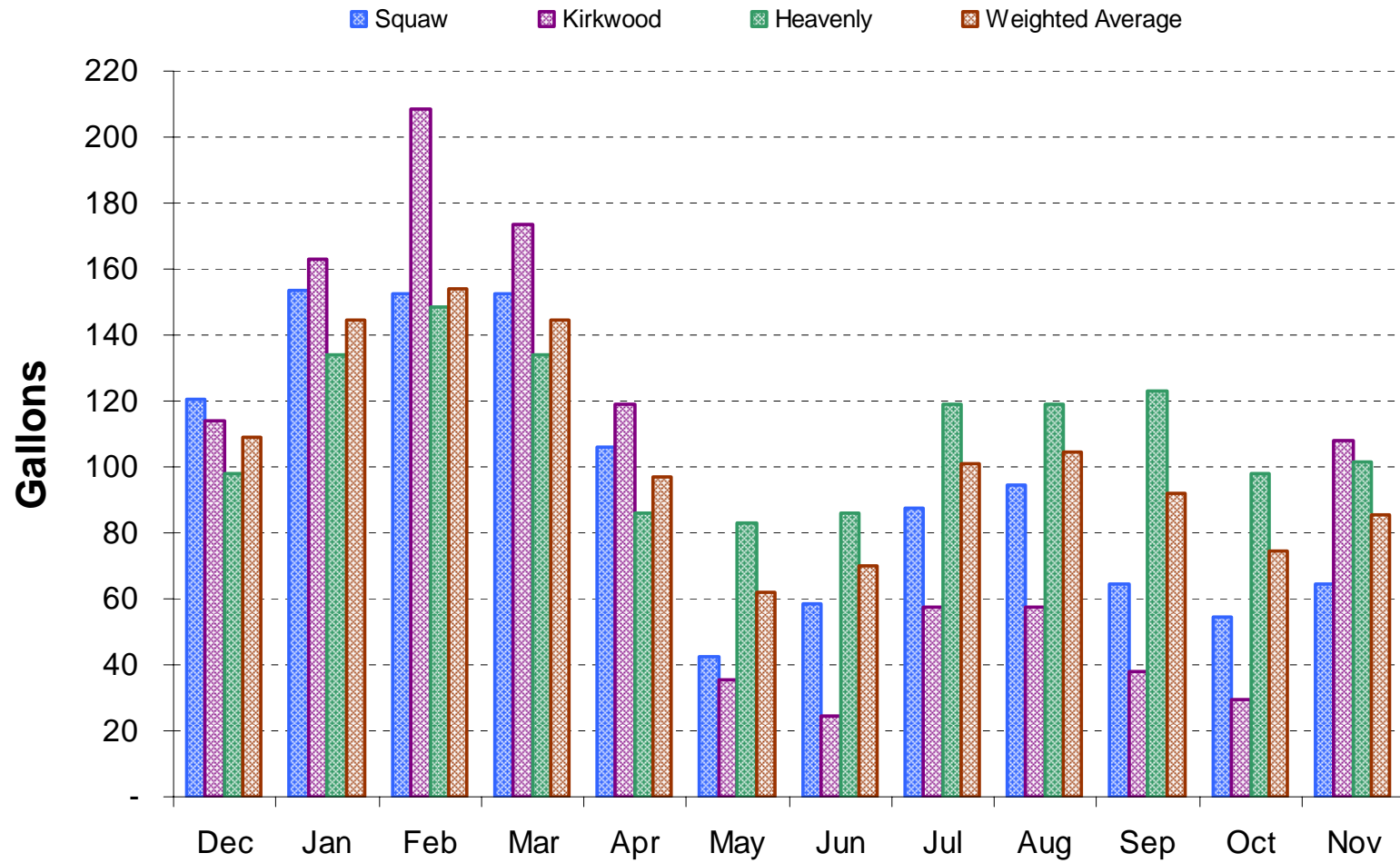
<b>Area</b>	<b>Product Type</b>	<b>Gross Sq Ft</b>	<b>Units</b>	<b>Average sq ft / unit</b>
<b>Area 1 (Resort Center)</b>				
Building A	Hotel/Condo	109,600	93	1,000
Building B	Hotel/Condo	55,600	47	1,000
Building C	Hotel/Condo	69,600	59	1,000
Building D	Condominium	24,600	14	1,500
Building E	Condominium	29,100	16	1,500
Building F	Condominium	30,000	17	1,500
Building G	Duplex	18,000	6	2,400
Building H	Cabins	14,400	12	1,000
Affordable	Affordable Housing		20	850
Commercial	Hotel/Condo	22,000		
<b>Subtotal Area 1</b>		<b>372,900</b>	<b>286</b>	
<b>Area 2</b>				
Single Family	Single Family		18	varies
Duplex	Duplex		44	2,000
Fourplex	Fourplex		44	2,000
<b>Subtotal Area 2</b>			<b>106</b>	
<b>Area 3</b>				
Single Family	Single Family		<b>48</b>	varies
<b>Area 4</b>				
Single Family	Single Family		7	varies
Affordable	Affordable Housing		20	
<b>Subtotal Area 4</b>			<b>27</b>	
<b>Area 5</b>				
Single Family	Single Family		<b>32</b>	varies
<b>TOTAL</b>			<b>499</b>	

scenarios lu

[1] Source: Rodeo Grounds Specific Plan, July 2005.

## Figure 1

## Hotel/Condo\* Gallons per Unit per Day excluding Irrigation



\* Resort Area (Village-Style) with Commercial Uses below units

**Figure 2**  
**Condominium Gallons Per Unit Per Day excluding Irrigation**

